Form and Function: Does the source of actin determine functional interactions with palladin?

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Abstract: Actin is one of the most abundant proteins in eukaryotes and regulates individual cell functions such as motility, cell shape, and muscle contractions. Yet, actin cannot work alone and interacts with over 150 actin-binding proteins (ABPs). Research in Dr. Beck's lab is focused on the ABP named palladin. Palladin has been linked to the regulation of normal embryonic development and wound healing, but also to cancer metastasis. Palladin is widely expressed in all different types of human cells, however, all prior research has utilized a form of actin from muscle cells.

Several different isoforms of actin vary in protein sequence, location, and function. The most notable being muscle actin, which is the isoform of actin that is most used in biochemical experiments as it is easy to isolate from tissue and is cost-effective. However, there are some drawbacks to using muscle actin such as its heterogeneity and post-translational modifications that are not found in non-muscle actin isoforms. Our hypothesis is that different forms of actin may alter the interaction and overall function of the paladin-actin complex. Therefore, we are working to implement a previously established method of purifying non-muscle actin isoforms so that relevant studies can be carried out to examine the role of palladin in actin dynamics. In our studies, we used the yeast strain Pichia pastoris to express and purify the different non-muscle isoforms of actin. These results will help to elucidate the interactions between palladin and actin in eukaryotic cells and could help further the understanding of their roles in cancer progression.

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